BrightWater

for a Sound future

Phase 2
Siting the Brightwater Treatment Facilities

Executive Summary

September 2001

KING COUNTY

Contents

Overview

King County, in coordination with Snohomish County, is implementing a three-phase siting process to identify the best site for the proposed Brightwater wastewater treatment facilities. This report summarizes Phase 2 of this siting process.

King County is implementing its Regional Wastewater Services Plan (RWSP) designed to address the region's long-term wastewater treatment needs. The RWSP was an eight-year planning effort that supplemented and updated the County's comprehensive water pollution abatement plan to ensure adequate wastewater management facilities are available to serve future projected demands in the service area. The County's regional wastewater collection and treatment system currently serves over 1.3 million residential customers in King, Pierce and Snohomish Counties. Population growth is placing increasing demands on the system, particularly in north King and south Snohomish Counties. Nearly 40 years ago, two major wastewater treatment plants, the West Point Plant and the South Plant, were built in King County. To ensure that quality wastewater services are in place to protect public health and the environment, including threatened and endangered species, the RWSP calls for constructing a new wastewater treatment facility by 2010 to accommodate growth in the north service area and provide more flexibility throughout the entire system. The County chose the name *Brightwater* for the new north treatment facilities.

In late 1999, King County initiated a search for the new treatment plant site and an investigation of Puget Sound to determine suitable outfall locations. In Phase 1 of the siting process, approximately 100 land areas were reviewed as potential treatment plant sites. Of these, 35 sites were evaluated and screened, and six candidate sites were adopted by the King County Council for further evaluation in Phase 2. Also during Phase 1, research conducted in the northern basin of Puget Sound as part of the Marine Outfall Siting Study (MOSS) enabled the County Council to identify eight candidate outfall zones that were also adopted for more detailed analysis in Phase 2.

Phase 2 of the siting process, extending from June 2001 through December 2001, has involved, to date, the development and analysis of conceptual "candidate systems," concepts that include treatment plant sites with a general facility layout, two conveyance options and candidate marine outfall options. The two conveyance options include a "surface conveyance" option consisting primarily of pipelines buried underground but close to the surface, and a "deep tunnel" option with pipelines placed in tunnels deep underground. These conceptual systems were developed to allow consistent, comparative analysis between the candidates (particularly with respect to cost and potential impacts). The following schematic illustrates the components of the candidate systems that have been evaluated in Phase 2.

PHASE 2 CANDIDATE SYSTEMS

Plant Sites		Conveyance Options		Marine Outfall Options	
• **Edmonds Unocal**	+	• **Surface Pipeline**	+	• Zone 1	• **Zone 5**
• **Route 9**		• **Deep Tunnel**		• Zone 2	• **Zone 6**
• Point Wells				• Zone 3	• **Zone 7**
• Gravel Quarry				• Zone 4	• Zone 8
• Gun Range					
• Thrashers Corner					

Recommended Systems highlighted in bold

The Phase 2 evaluation concluded that of the six systems, four meet the policy site selection criteria and are suitable. The King County Executive found that two of these four best meet both the policy siting criteria and the broader goals and policies of the region. The Executive has recommended these two candidate systems, the Edmonds Unocal system and the Route 9 system, to the King County Council for advancement to Phase 3. The Council will review this recommendation and the supporting documentation and select final candidate systems for Phase 3 by December 2001.

Working Together to Site Brightwater

Approximately 60 percent of the wastewater to be treated at Brightwater will come from homes and businesses in Snohomish County; 40 percent will come from King County. Because of this, King County Executive Ron Sims has worked closely with Snohomish County Executive Bob Drewel on the siting process. The two Executives created a 24-member Siting Advisory Committee to help develop site screening criteria and provide comments on the siting process. Committee members were drawn from all sectors of the community in both counties, including tribal governments, city and state governments, utility districts, business, and environmental advocacy organizations. The committee met regularly and included a public comment period as part of each agenda. A technical committee, the Metropolitan Water Pollution Abatement Advisory Committee, and a policy committee, the Regional Water Quality Committee, are reviewing and helping to shape the process as well.

Public involvement and community partnerships are critical to the project's success. Brightwater's Public Involvement Plan was created to promote open communication with interested and affected community members, and to encourage their participation in the siting process. During Phase 2, over 60 meetings were held with regional leaders and over 30 presentations were given to local governments, businesses and environmental groups. In addition, four public workshops were held and Brightwater information booths were staffed at three fairs and festivals in the site selection area. As part of the public outreach effort, King County has made extensive use of the Internet and newsletter mailings to provide information on the siting process. An average of 1,500 visits per month have been made to the Brightwater home pages, and close to 700 pieces of Brightwater related correspondence have been received by the County.

Creating Policy Site Selection Criteria

In Phase 1, the two Executives developed draft policy site screening criteria, based on public comments, that were refined by the advisory, policy and technical committees. The King County Council reviewed and revised the policy site screening criteria, and adopted them in Ordinance 14043 during February 2001. These policy site screening criteria were used to identify the best candidate plant sites and marine outfall zones for advancement to Phase 2. The six candidate sites were Edmonds Unocal, Point Wells, the Gun Range, the Gravel Quarry, Thrashers Corner and Route 9. Eight marine outfall zones were also identified. The sites and marine outfall zones were adopted by the King County Council in Ordinance 14107, on May 15, 2001. In the same ordinance, the King County Council adopted a refined set of policy site selection criteria. The policy site selection criteria set forth in Ordinance 14107 were applied in Phase 2 to determine the most suitable proposed candidate systems.

Applying Policy Site Selection Criteria

To apply the adopted policy site selection criteria systematically, the project team developed a set of Detailed Evaluation Questions (DEQs) – measurable questions that help evaluate how well each site meets the policy criteria. The DEQs primarily address potential project constraints and opportunities. In Phase 2, the DEQs addressed technical (engineering and land acquisition), environmental, community (neighborhood effects) and financial policy considerations. For each policy criterion, one or more DEQs were applied to the six candidate systems during the Phase 2 process. Data sources for this level of system evaluation included site reconnaissance, aerial photographs, local plans, published environmental and geotechnical data, known permitting requirements, title reports, and cost estimates from comparable construction projects.

Based on the experience and professional judgement of the project team, and the data available at this stage, certain questions became key siting factors, such as useable site area, total conveyance pipe length, legal restrictions on title, Endangered Species Act compliance, wetlands, compatibility with surrounding land use, and traffic disruption. These DEQs, referred to as key factors, were given more emphasis at this stage in the evaluation to determine the most suitable candidate systems overall for advancement to Phase 3.

Recommended Candidate Systems

Using the policy site selection criteria, the six candidate systems and eight marine outfall zones advanced from Phase 1 were evaluated in Phase 2 to determine which of these best satisfy the policy criteria and should be advanced to Phase 3 for further evaluation. Phase 3 includes formal Washington State Environmental Policy Act and the National Environmental Policy Act (SEPA/NEPA) environmental review and concurrent detailed engineering, geotechnical, and cost analysis, as well as continued public input. Table 1 summarizes the results of the Phase 2 policy evaluation of the candidate system alternatives.

Of the six alternatives, the Gun Range site failed to meet all of the mandatory policy site selection criteria and is not recommended for advancement to Phase 3. Development of the Gun Range site would displace an existing use that supports public safety and law enforcement training, and relocation is not possible within a reasonable time frame or within a reasonable geographic distance to the existing Gun Range. These findings make it inconsistent with a mandatory policy site selection criterion established by the Council. In addition, the Thrashers Corner site was found to be the least suitable site option in light of the policy site selection criteria, particularly on the basis that the extensive on-site wetlands limit and fragment the useable area. The remaining four sites – Point Wells, Edmonds Unocal, Gravel Quarry, and Route 9 – were all found to be consistent with the policy site selection criteria and to be suitable options that could serve as reasonable alternatives for consideration in future environmental review.

TABLE 1
CANDIDATE SYSTEMS EVALUATION SUMMARY

Site	Meets Mandatory Policy Site Selection Criteria	Level of Suitability	Executive's Recommendation
Edmonds Unocal	Yes	Suitable	Advance to Phase 3
Route 9	Yes	Suitable	Advance to Phase 3
Point Wells	Yes	Suitable	
Gravel Quarry	Yes	Suitable	
Thrashers Corner	Yes	**Unsuitable**	
Gun Range	**No**		

The King County Executive considered these four candidate systems in light applicable goals and policies and found that two alternatives rose above the rest: Edmonds Unocal and Route 9. These two systems offer significant opportunity for intergovernmental partnerships that benefit the surrounding communities as well as meet regional goals and needs addressing efficient use of urban land, provision of affordable and multi-modal transportation options, revitalization of land, and the balancing of urban land uses with environmental protection. The Executive recommends these two candidate systems for advancement to Phase 3.

In addition, the Executive recommends that for the conveyance component of the system, both the surface conveyance and the deep tunnel options be advanced for further review. A decision regarding the method of conveyance construction (surface pipeline or deep tunnel) and specific conveyance routes cannot be made at this time. More detailed, site-specific study of these options, which is planned for Phase 3, will be needed before a decision can be made on which conveyance approach is preferable for each candidate system. At the present time, the deep tunnel conveyance option appears preferable due to its lower overall impact, lower capital cost and lower operation and maintenance cost.

Finally, for the marine outfall component, all eight outfall zones were found to be suitable; however, three are recommended for advancement because of their proximity to the recommended treatment and conveyance systems. The three candidate outfall zones deemed most suitable for advancement include: 5, 6, and 7 (North and South). A total of five diffuser sites within these three outfall zones have been identified for advancement. A diffuser site will not be selected until after detailed environmental review is completed.

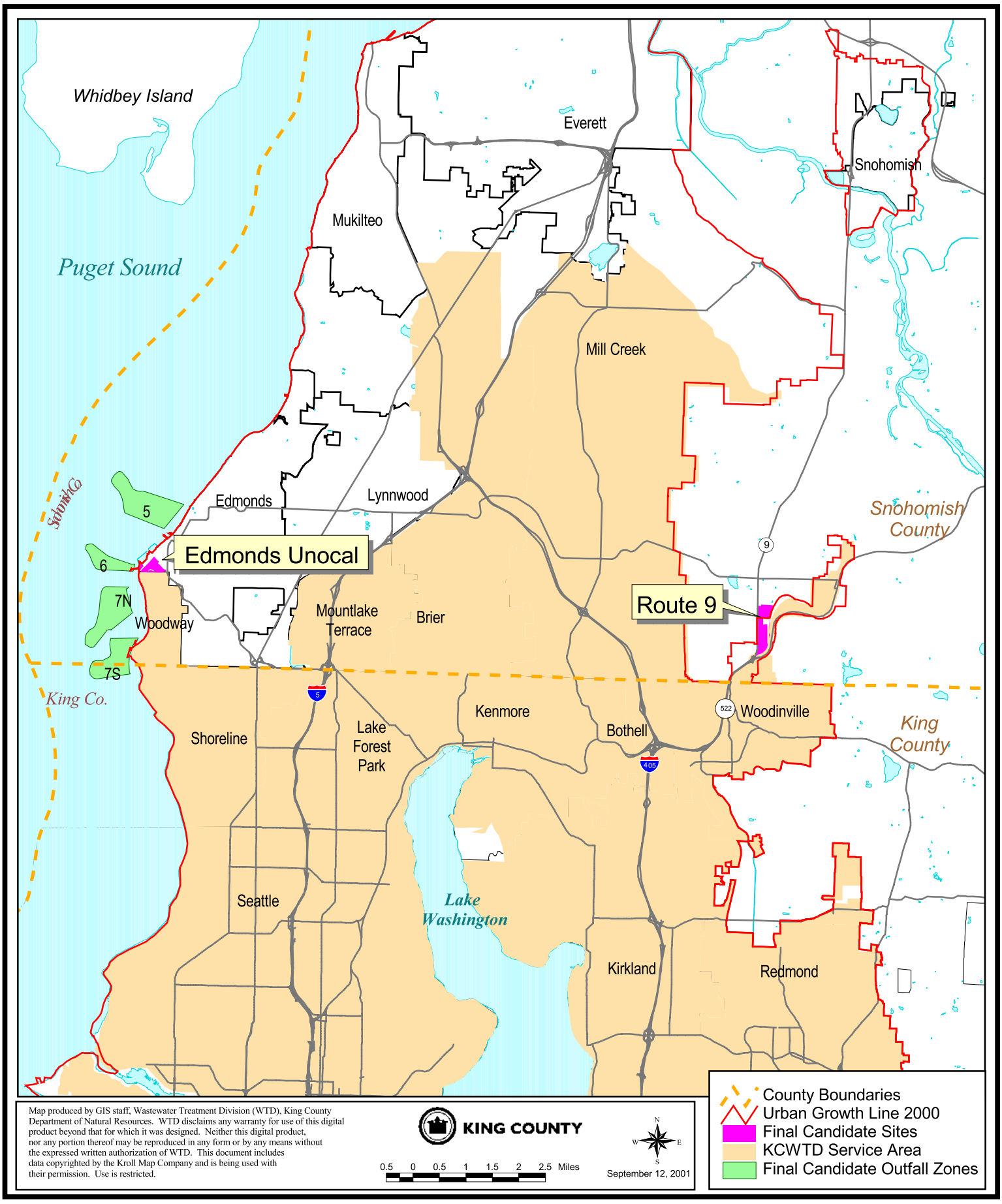
The following schematic and Figures 1, 2a and 2b show the proposed final candidate systems recommended by the King County Executive to the King County Council. Figures 1, 2a and 2b.

PROPOSED FINAL CANDIDATE SYSTEMS

Plant Sites		Conveyance Options		Marine Outfall Options
• Edmonds Unocal • Route 9	+	• Surface Pipeline • Deep Tunnel	+	• Zone 5 • Zone 6 • Zone 7 (north and south)

The King County Council will review the proposed candidate systems and supporting documentation, and select final candidate systems for detailed environmental review in Phase 3 of the Brightwater site selection process.

The Phase 2 evaluation process was designed to narrow the range of options for the Brightwater facilities and to define a reasonable range of alternatives for Phase 3 SEPA/NEPA environmental review. It is necessary to identify at least two feasible alternatives for full consideration during the entire SEPA/NEPA analysis and this has been accomplished through the Phase 2 effort. Evaluation of the top two options in Phase 3 will streamline the environmental review process, focusing resources and attention on the best candidates and helping the County meet its project schedule to have the Brightwater facilities under construction by 2005 and fully operating by 2010. The risk in including only two alternatives in the SEPA/NEPA review process is that one of the alternatives may prove not to be viable once detailed and site-specific environmental, geotechnical and engineering analysis is conducted. If one site drops from consideration, another alternative will need to be added midway through the SEPA/NEPA process, which could delay the schedule.



BrightWater

Figure 1 - Proposed Final Candidate Sites and Marine Outfall Zones

Edmonds Unocal Site Information

Overall

- The Edmonds Unocal site is located in the City of Edmonds, southeast of the Port of Edmonds marina. It is an inactive industrial site, and it is owned by Unocal.
- A multi-modal transportation facility, the Edmonds Ferry Crossing project, is planned for the same site and could be co-located with the wastewater facility.
- A possible opportunity exists to consolidate some functions with the Edmonds Wastewater Treatment Plant.
- Because it is near the shoreline, this site requires relatively fewer miles of conveyance pipe. It also has a low to moderate elevation
- The site is steeply sloped and located on a visible hill above the Edmonds commercial district. It is directly across the street from residential development to the south.
- A marsh and stream corridor on the site could offer habitat protection and/or enhancement opportunities.
- The site offers industrial zoning with inactive use; meets size, elevation, and conveyance requirements; and provides community partnership opportunities and habitat restoration potential.

Engineering

- Access to the site is via a four-lane roadway. The site is approximately 4 miles from the nearest freeway.
- Approximately half of the useable area is sloped at 10% to 30% and would require earthwork and retaining walls.
- The flat portion of the site has soils that are susceptible to liquefaction and would require foundation stabilization for construction.
- Low elevation of the site would minimize pumping requirements and energy useage with the tunnel option.
- Short conveyance length would minimize construction costs and disruption.
- Longer influent line provides opportunity for storage of peak flow and potential phasing of treatment facilities.

Environmental/Community

- The Unocal Marsh occupies a large portion of the lower site, and heron nests are located on the hillside between the developed upper area and the marsh. The project offers unique opportunities to protect and enhance these resources.
- The site is industrial; medium-density residential development and waterfront commercial uses surround the site.
- A portion of the site is unusable for construction due to the presence of wetlands and Deer Creek.
- A portion of the site is located along the Puget Sound shoreline; however, treatment facility development is likely to occur outside the shoreline area.
- A portion of the site is currently undergoing clean-up of contaminated soils.
- The site contains documented, federally protected archaeological resources in the marsh area adjacent to Deer Creek, which could be avoided during site development.

Land Acquisition

- Unocal has expressed interest in marketing the property.
- The low level of current use on the site indicates relatively minor relocation difficulty.
- Restrictions on title do not appear to limit available useable land.

Cost Range (Yr 2001 Million $)

- Capital cost: $997–$1,120 million

  Capital costs include costs necessary to design and construct the complete Brightwater system including plant, conveyance and outfall.
- Annual operations & maintenance (O&M) cost: $148–$172 million

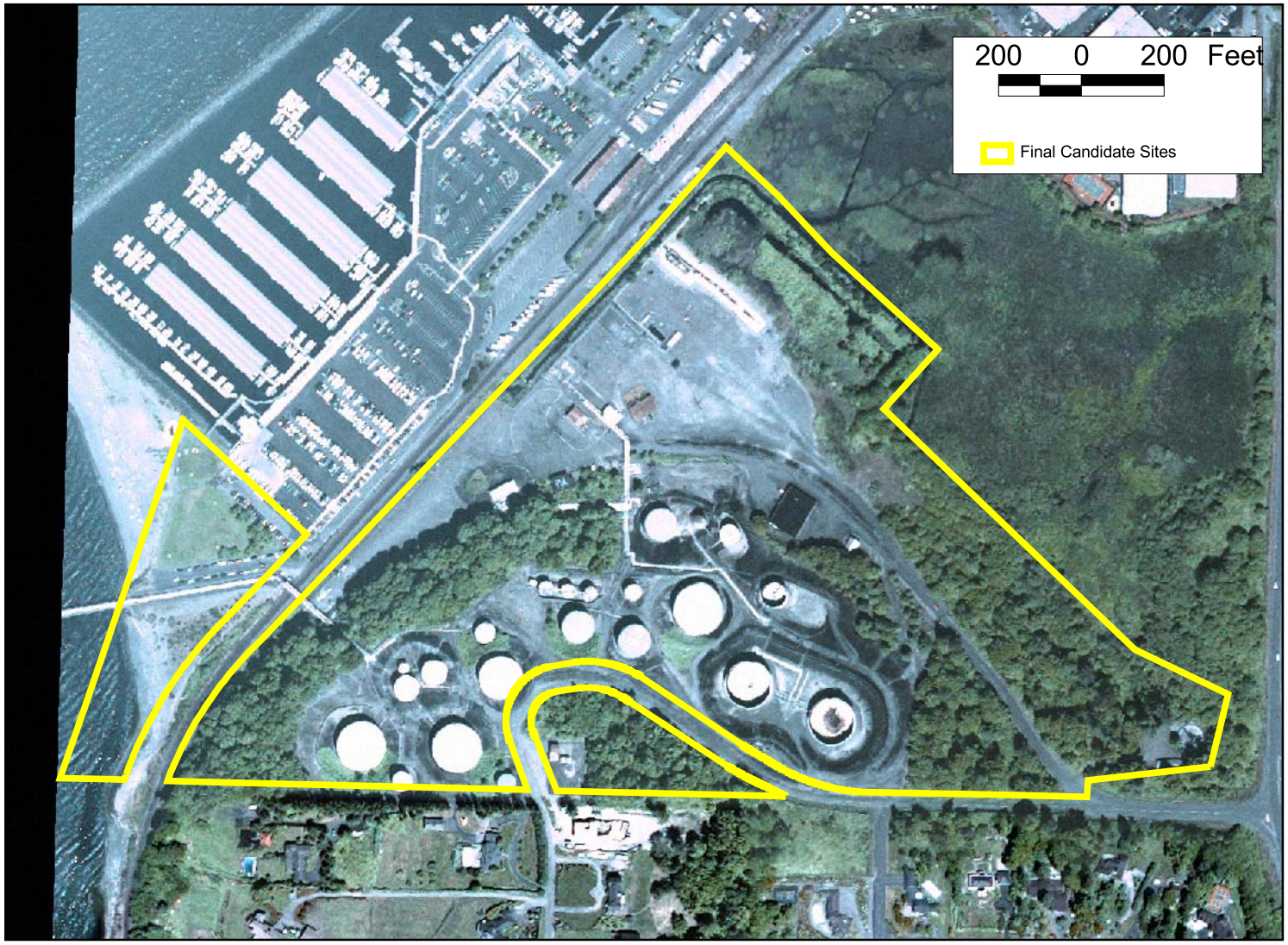
  Annual O&M costs include the labor, energy and materials to run the plant for the next 20 years.

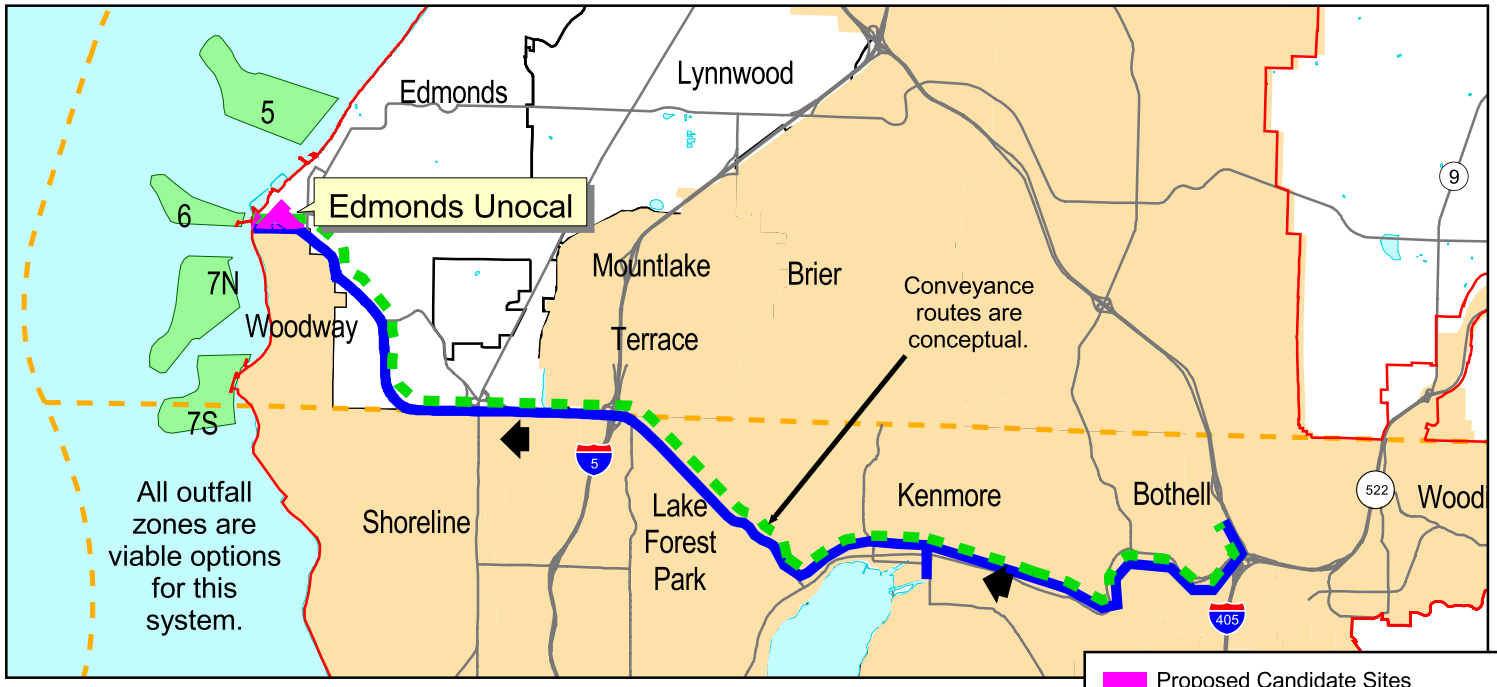
System

- Opportunities for water reuse exist.
- Flexibility exists for flow management during emergencies.
- Energy requirements are low for the deep tunnel conveyance option and moderate for the surface option.

System Details

Site Name:	Edmonds Unocal	
Location:	City of Edmonds	
Estimated Total Area:	53 acres	
Estimated Useable Area:	40 acres	
Site Elevation Range:	10–175 ft. Mean Sea Level	
	Tunnel	**Surface**
Conveyance Length:	13 miles	14 miles
No. of Pump Stations:	3	5
No. of Portals and Access Shafts:	5	3





BrightWater

Figure 2a - Edmonds Unocal
Proposed Final Candidate System

Route 9 Site Information

Overall

- This site is in unincorporated Snohomish County, east of Highway 9 at 228th Street SE, close to Highway 522, and north of the City of Woodinville.
- It has a large useable area, relatively low elevation and requires the longest length of conveyance pipes.
- The large area allows for flexibility in the design of treatment facilities and ample space for upgrades.
- The site has industrial properties on it and is surrounded by light industrial and rural residential uses.
- The site offers large size, low elevation, flat building site, accessibility to the freeway, current industrial use, limited sensitive natural resources on the site, and adequate size to provide generous buffers between the plant and neighbors.

Engineering

- Access to the site is via Highway 9 and Highway 522; the freeway is less than 1 mile away. These roadways have existing capacity problems.
- The useable area is large and provides major buffer opportunities and flexibility in the type and arrangement of facilities on site.
- The site has minimal slope and does not require major earthwork or retaining walls.
- No landslide potential or liquifiable soils are present on site.
- Elevation of the site results in low energy useage with the tunnel option.

Environmental/Community

- The site is largely impervious and lacking in vegetation. A portion of the site contains a small, moderate quality wetland. Given the large site size, this wetland area could be avoided and/or enhanced.
- A number of small, piped streams cross the site, tributary to Little Bear Creek, a high quality salmonid stream. Two natural streams, also tributary to Little Bear Creek, cross the site and have setback requirements similar to Little Bear Creek. These streams could be enhanced.
- New plantings could be used to provide visual buffers where there is currently little vegetation.
- The site size provides a relatively large area for community, environmental and/or habitat enhancement.
- Prior land uses at the site may have resulted in areas of soil and/or groundwater contamination; additional study will be required.

Land Acquisition

- The number of businesses on site increases relocation complexity.
- Restrictions on title do not appear to limit available useable land, though several restrictions such as utility and ingress/egress easements complicate acquisition efforts.

Cost Range (Yr 2001 Million $)

- Capital cost: $1,333–$1,373 million

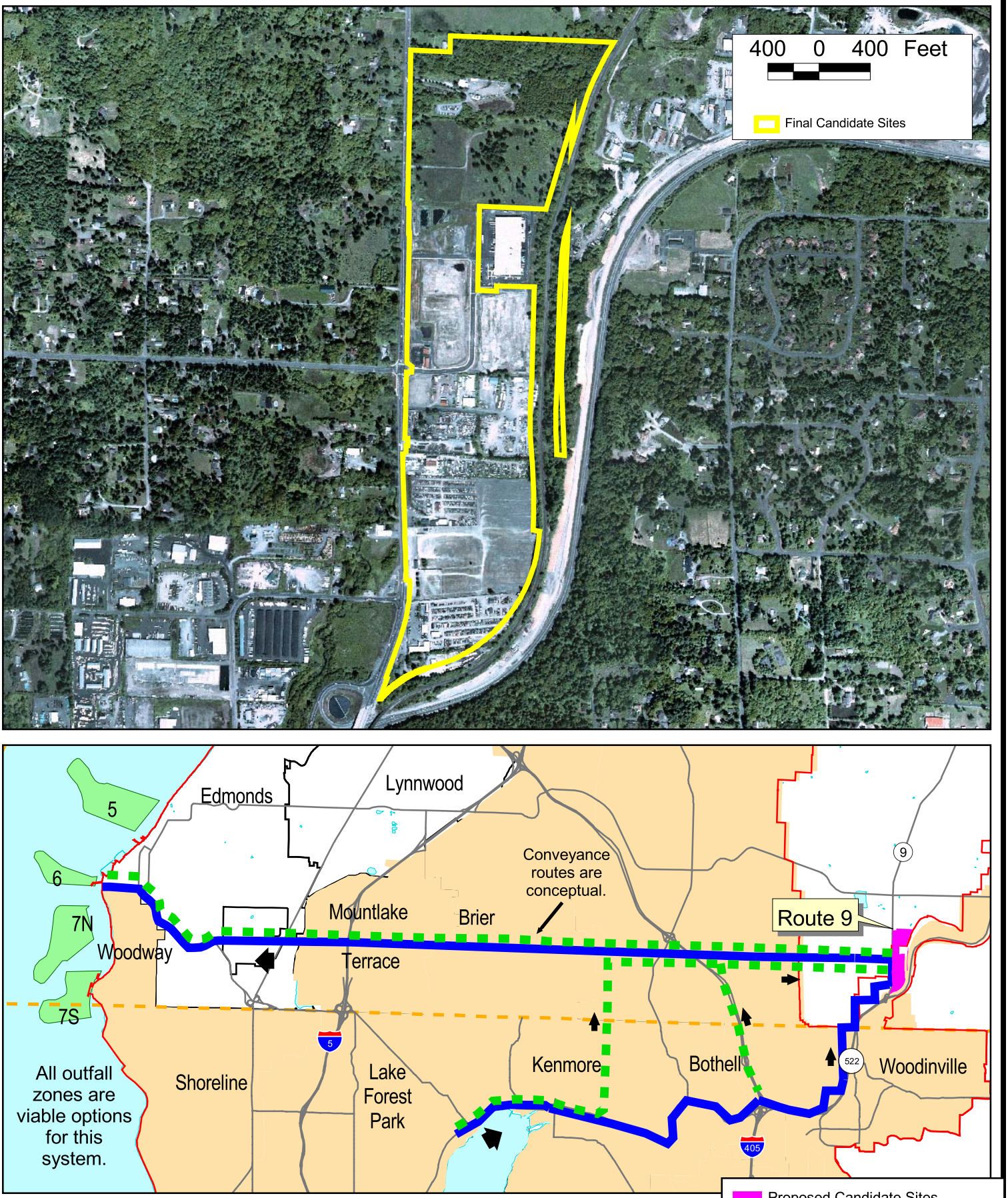
  Capital costs include costs necessary to design and construct the complete Brightwater system including plant, conveyance and outfall.
- Annual operations & maintenance (O&M) cost: $174–$198 million

  Annual O&M costs include the labor, energy and materials to run the plant for 20 years.

System

- Opportunity for water reuse at potentially lower cost.
- Highly flexible for flow management during emergencies with the deep tunnel option; limited flexibility with the surface option.
- Energy requirements are low for the deep tunnel conveyance option and high for the surface conveyance option.

System Details		
Site Name:	Route 9	
Location:	Unincorporated Snohomish County	
Estimated Total Area:	111 acres	
Estimated Useable Area	79 acres	
Site Elevation Range:	150–200 ft. Mean Sea Level	
	Tunnel	**Surface**
Conveyance Length:	23 miles	22 miles
No. of Pump Stations:	2	5
No. of Portals and Access Shafts:	11	7



BrightWater

Figure 2b - Route 9
Proposed Final Candidate System

Cost Estimates for the Brightwater Systems

The Brightwater facilities include a new treatment plant, its associated conveyance facilities, and an outfall to Puget Sound. As the siting and design process moves forward, cost estimates will be refined at each stage. A final cost estimate will be developed when a final site is selected.

Table 2 shows the preliminary cost estimates for the systems that meet the policy site selection criteria. The capital cost estimates include the cost of purchasing land, obtaining permits, providing mitigation, and designing and constructing the plant, conveyance system, and marine outfall. Operations and maintenance (O&M) costs include labor, energy, materials and equipment repair for the Brightwater facilities for 20 years. A cost estimate for each conveyance option – surface and deep tunnel – is shown. Because the capital costs are preliminary, a cost range is also provided, from 25% below to 40% above the estimated capital cost figures.

TABLE 2
ESTIMATED COSTS FOR SUITABLE SYSTEMS THAT MEET POLICY SITE SELECTION CRITERIA (IN MILLIONS OF DOLLARS)

Systems (with conveyance options)	Capital Cost [a,b]	O&M Cost [c]	RWSP Index [d]	Range of Capital Cost [a,b,e] Total –25%	Total +40%
Edmonds Unocal (surface)	**$1,120**	**$172**	**1.33**	**$969**	**$1,809**
Edmonds Unocal (tunnel)	**$997**	**$148**	**1.18**	**$859**	**$1,603**
Route 9 (surface)	**$1,373**	**$198**	**1.61**	**$1,178**	**$2,199**
Route 9 (tunnel)	**$1,333**	**$174**	**1.55**	**$1,130**	**$2,109**
Point Wells (surface)	$1,055	$167	1.26	$917	$1,711
Point Wells (tunnel)	$948	$144	1.12	$819	$1,529
Gravel Quarry (surface)	$1,126	$182	1.34	$981	$1,831
Gravel Quarry (tunnel)	$1,168	$174	1.38	$1,006	$1,878

Notes: Systems in bold are Proposed Final Candidate Systems. All cost are in 2001 dollars.

[a] Costs shown are for a 36-mgd secondary treatment plant, conveyance facilities and outfall to Puget Sound.
[b] Contingency for construction has been included using the following percentages: treatment plant at 25%, conveyance at 30%, and marine outfall at 35%.
[c] Operations and maintenance (O&M) costs include labor, energy, materials and equipment repair for the Brightwater facilities for 20 years.
[d] RWSP Index compares original Regional Wastewater Services Plan capital cost estimates with current capital cost estimates.
[e] Range of capital cost based on planning-level estimates with ranges between -25% and +40%.

The capital costs for the alternative systems (in 2001 dollars) range from $948 million for Point Wells with a deep tunnel to $1.37 billion for Route 9 with surface conveyance. Point Wells was used in the Regional Wastewater Services Plan for cost estimating purposes. The new cost estimates reflect approximately a 12 percent increase over the RWSP costs, which is largely due to the rapid rise in land values seen in the region and from the addition of advanced odor control in the basic facility. The other proposed candidate systems are more expensive because of the unique features of the sites and the amount of conveyance required for the systems. The costs are planning-level estimates with contingencies added.

They are subject to significant refinement before a final system is selected.

Even though Edmonds Unocal and Route 9 have the potential to be more expensive, the King County Executive believes the benefits these sites provide outweigh the higher costs. These facilities will serve our region for 100 years or more and it is important that the best possible choice is made for the long term.

The new facilities will have a modest effect on rates for existing customers. This is because, in addition to their monthly sewer rate, new customers will pay a capacity charge (fees for new connections to the system) that will help finance the facilities needed to accommodate growth in our region. The capacity charge will help keep rates stable for existing customers.

Next Steps – Phase 3

An overall timeline of the project is shown below in Table 3. Public involvement will continue throughout the siting process in Phase 3. Members of the public will be invited to comment on the proposed candidate systems throughout Fall 2001 at open houses, meetings, in writing, and on the project website. Once the King County Council approves final candidate systems, an Environmental Impact Statement (EIS) will be prepared and reviewed by the public under the SEPA/NEPA process. King County will seek certain federal permits and approvals for construction of Brightwater. As a result, the EIS, to be prepared in 2002/2003, will be a joint document that satisfies the procedural requirements of both Washington's State Environmental Policy Act (SEPA) and the National Environmental Policy Act (NEPA).

TABLE 3
PROJECT TIMELINE

SEPT. 2001	King County and Snohomish County Executives announce proposed final candidate systems
OCT. 2001	Open House Public Meetings
DEC. 2001	Based on the adopted criteria, King County Council selects and approves final candidate systems to be advanced for SEPA/NEPA review
WINTER 2002	Public Scoping Meetings
2002/2003	Comprehensive SEPA/NEPA environmental review conducted on final candidate systems
SPRING/ SUMMER 2002	Community Design Workshops
FALL 2002	Draft EIS Hearings and public comment period
2003	King County Executive selects a system for the Brightwater project, including the treatment plant, conveyance system and marine outfall
2003–2005	Design and permitting of project system facilities
2005–2010	Phased construction of project system facilities
ONGOING	Speakers bureau, public outreach and website interactive information

Phase 3 will include site-specific investigations for geotechnical (e.g., soil borings), natural resources (e.g., wetlands, streams and endangered species), and built environment (e.g., transportation, utilities and land use) issues at proposed treatment plant sites, conveyance corridors and marine outfall facility locations.

Concurrent with the SEPA/NEPA evaluation, the project team will continue evaluation of engineering, land acquisition and cost considerations. The King County Executive will review the completed Phase 3 analyses of engineering, environmental, community and financial factors as well as public input and select the preferred Brightwater system for development in 2003.